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In the first appearance of the hair Maurer sees additional evidence in favor of his view. We have already alluded to the rows in which the earliest hairs are arranged. Maurer finds that the first tactile hairs to appear are arranged in the following rows: (1) supraorbital; (2) infraorbital; (3) zygomatic; (4) angular; (5) upper lip; (6) under lip; and (7) submental; and that these rows follow in a striking way, the course of the tegumentary branches of the tregeminal nerve. The other hairs are not irregularly arranged but are also in regular rows (see fig. 4) and, thinks Maurer, these rows are closely connected with the rows of sensory organs in the Amphibian skin. The grouped arrangement of hairs is secondary and the point of origin of a group is a single hair the follicle of which by budding gives rise to other follicles and hence to the hair group. Such a means of increase is found no where else than in the sensory organs of the Ichthyopsida.

It would be interesting did space permit to go farther into this subject and to take up other tegumentary structures. It is, however, hoped that this brief review will lead to the reading of Keibel's summary already referred to with its bibliography of over one hundred titles.

BIRDS OF THE GALÁPAGOS ARCHIPELAGO: A CRITICISM OF MR. ROBERT RIDGWAY'S PAPER.

By G. Baur,
UNIVERSITY OF CHICAGO.

On the 30th of March, Mr. Ridgway published a paper on the "Birds of the Galápagos Archipelago,"[1] in which he makes the following remarks in regard to the genus Geospiza:

" Few genera equal the present one in the extreme modifications in the form of the bill, which in some species (*magnirostris* and *strenua*) is, perhaps, not excelled by that of any member of the family Fringullidæ in its extreme thickness; in others (members of the so-called genus Cactornis) slender and decurved; in others very acute, with straight outlines, and, in others still, elevated and arched at the base. The most extreme forms are, however, so gradually connected by intermediate types, that there seems no possibility of satisfactorily subdividing the genus into two or more sections. The extreme modifications of the bill and some of the connecting forms are shown in the outline illustrations on plate LVII.

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[1] Proc. U. S. Nat. Mus. (No. 1116), Vol. XIX, p. 459-560, Pl. LVI-LVII, Washington, 1896.

"The reduction of Cactornis to a synonym of Geospiza has already been made in my paper describing the new species of Galápagos birds in Dr. Baur's collection, in which is announced the discovery of species which absolutely bridge the previously existing gap between the so-called genera Geospiza and Cactornis, thus necessitating the suppression of one of those names (the latter, according to the rule of priority). Dr. Baur, who has had the advantage of studying these birds in life, disapproves of this, as the following extract from one of his letters will show: 'I should like to make a few remarks, if you will permit me, about Cactornis and Geospiza. You place the species of these two genera in one genus, Geospiza. I do not think that this is natural. Both have their peculiar representatives on the different islands, and if you place them together, this peculiar differentiation of each is lost sight of. Cactornis is more slender than Geospiza, and has many more black individuals. I would keep the two genera apart, and would not hesitate to place *Geospiza propinqua* in Cactornis.' I am quite willing to adopt Dr. Baur's views concerning the position of *G. propinqua,* which I had compared with *G. conirostris* (a true Geospiza); but, while admitting that it would be very convenient to recognize Cactornis if any definite characters could be found which will serve to separate them. The character which comes nearest to doing so, apparently, the relative width of the mandible between the bases of the rami to the length of the gonys, which is very much less in typical Cactornis than in true Geospiza. This greater compression of the bill even serves to trenchantly separate *Cactornis propinqua* from *G. conirostris,* some individuals of which are almost precisely alike in the lateral profile and measurements of the bill."

	Albemarle I.	Indefatigable I.	James I.	Jervis I.	Duncan I.	Barrington I.	Charles I.
Nesomimus	parvulus (Gould)	melanotis (Gould)	melanotis (Gould)	melanotis (Gould)	O	barringtonensis	trifasciatus (Gould)
Certhidia	albemarli Ridgw.	salvini Ridgw.	olivacea Gould	spec.	spec.	bifasciata Ridgw.	O
Pyrocephalus	intercedens Ridgw.	intercedens Ridgw.	nanus Gould	nanus Gould ?	spec.	O	carolinensi Ridgw.
Cactornis	Spec. (fatigata ?)	fatigata Ridgw.	scandens Gould	spec.	spec.	barringtonensis Ridgw.	intermedia Ridgw.
Geospiza Series I.	strenua-magnirostris Gould	strenua Gould	strenua Gould	strenua-magnirostris Gould.	———	———	magnirostri Gould (Darwin)
Geospiza Series II.	fortis Gould (albemarli Ridgw.)	fortis Gould	bauri-fortis Ridgw. Gould.	fortis Gould.	fortis Gould	fortis Gould ?	fortis Goul
Geospiza Series III.	fuliginosa Gould	fuliginosa Gould	fuliginosa Gould	fuliginosa Gould	fuliginsoa Gould	fuliginosa-parvula Gould	fuliginosa Go
Camarhynchus Series I.	variegatus Scl. & Salv.	variegatus Scl. & Salv.	variegatus Scl. & Salv.				variegatus Scl. & Salv. (crassirostri Gould)
Camarhynchus Series II.	affinis Ridgw.	psittaculus Gould	psittaculus Gould incertus Ridgw.	psittaculus Gould compressirostris Ridgw.	spec.	spec.	psittaculus Gould
Camarhynchus Series III.	prosthemelas Scl. & Salv.	prosthemelas Scl. & Salv.	prosthemelas Scl. & Salv.	prosthemelas Scl. & Salv.			prosthemela Scl. & Salvi pauper Ridg
Tropidurus	albemarlensis Baur	indefatigabilis Baur	jacobii Baur	jacobii Baur	duncanensis Baur	barringtonensis Baur	grayi (Bell
Phyllodactylus	galapagoensis Pet.	———	———	———	———	———	baurii Garn
Schistocerca	melanocera Stål.	melanocera Stål.	melanocera Stål.	melanocera Stål	melanocera Stål.	melanocera Stål	melanocera Stål
Euphorbia viminea	albemarlensis (eypica)		jacobensis	jervensis		barringtonensis	carolensis

uncan I.	Barrington I.	Charles I.	Hood I. Gardner I.	Chatham I.	Tower I.	Bindloe I.	Abingdon I.
O	barringtonensis	trifasciatus (Gould)	macdonaldi Ridgw.	adamsi Ridgw.	bauri Ridgw.	bindloei Ridgw.	personatus Ridgw.
spec.	bifasciata Ridgw.	O	cinerascens Ridgw.	luteola Ridgw.	mentalis Ridgw.	spec.	fusca Scl. & Salv.
spec.	O	carolinensis Ridgw.	O	dubius Gould.	O	spec.	abingdoni Ridgw.
spec.	barringtonensis Ridgw.	intermedia Ridgw.	O	spec.	propinqua Ridgw.	spec.	abingdoni Scl. & Salvin
———	———	magnirostris Gould (Darwin)	conirostris Ridgw.	magnirostris Gould (Darwin)	pachyrhyncha Ridgw.	strenua Gould	strenua Gould
tis Gould	fortis Gould ?	fortis Gould	media Ridgw.	dubia Gould	O	fortis Gould ?	fratercula Ridgw.
insoa Gould	fuliginosa-parvula Gould	fuliginosa Gould	fuliginosa Gould	fuliginosa-parvula Gould	acutirostris Ridgw.	parvula Gould	parvula Gould
		variegatus Scl. & Salv. (crassirostris Gould)	O	variegatus Scl. & Salv.	O	bindloei Ridgw.	habeli Scl. & Salv.
spec.	spec.	psittaculus Gould	O		O		
		prosthemelas ? Scl. & Salvin pauper Ridgw.	O	salvini Ridgw.	O		
ncanensis Baur	barringtonensis Baur	grayi (Bell)	delanonis Baur	bivittatus (Peters)	O	habelii Steind.	pacificus Steind.
———	———	baurii Garm.	———	leei Cope	———	———	———
elanocera Stål	melanocera Stål	melanocera Stål	literosa punctata Scudd.	literosa discoidalis Scudd.	literosa hyalina Scudd.	———	———
	barringtonensis	carolensis		chathamensis	castellana		abingdonensis

I shall show now that the *Cactornis propinqua* Ridgway from Tower Island in the north and the *Geospiza conirostris* Ridgway from Hood Island in the south of the Archipelago have no relationship whatever. The distance between Hood and Tower is one hundred nautical miles. Mr. Ridgway arranges the different species of Geospiza (including Cactornis) in a single line, to show the gradual connection between the different forms. I can not agree with this.

My opinion is the following: All the plastic genera, which are represented only by a single species on each island, as Nesomimus, Certhidia, Pyrocephalus and Cactornis, show peculiar species on nearly every island. The same is true for the iguanoid lizard Tropidurus, the land tortoises, for Phyllodactylus of the Geckonidæ, of the genus Schistocerca of the Orthoptera,[2] and one of the most striking examples is offered by *Euphorbia viminea* Hook. fil. of the Euphorbiaceæ.[3]

But there are genera, like Geospiza and Camarhynchus, which have more than one species on one island—two or three, perhaps four.[4] How can we explain this? I think it is not difficult to answer this question. We simply have to imagine that already, before the splitting up of the Galápagos landarea into distinct islands, there existed at least 3 species of Geospiza and Camarhynchus, each of which became differentiated on the different islands. This shows at once that we can not arrange these species in one series, but in 3 parallel series. In some islands, as will be seen from the table, one or the other form of the 3 series may be missing. This conclusion I reached the 16th of August, 1891, on James Island, and I have published it in 1892.[5]

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[2] Baur, G. The differentiation of species on the Galápagos Islands and the origin of the group. Biological lectures del. at the Marine Biol. Laborat. of Wood's Holl, summer session of 1894. Boston, 1895, p. 67–78.

[3] Robinson, B. L. and J. M. Greenman. On the Flora of the Galápagos Islands, as shown by the collections of Dr. G. Baur. Amer. Journ. Science, Vol. L, August 1, 1895, p. 135–149.

[4] I consider *Geospiza magnirostris* Gould and *G. strenua* Gould as unseparable. Species which are based on a single specimen like *Geospiza dentirostris* Gould, and the locality of which is unknown, are of no use. *Geospiza difficilis* Sharpe must be restricted to Abingdon. This leaves 3 species only for Charles. If there are more than 3 or 4 species of Geospiza said to occur on one island, I have no doubt that there is some mistake.

If Geospiza was represented by three species, when all the islands were still in connection, each of these, after the segregation into different islands, developed its own races, which gradually became species. We always can recognize these three forms if they are present on a single island, and they never intergrade on the same island. We can distinguish three parallel series of Geospiza. First the large forms, represented by *Geospiza strenua* Gould; second, the medium-sized forms represented by *Geospiza fortis* Gould, and, third, the small forms represented by *Geospiza fuliginosa* Gould. The same is true for Camarhynchus. The table shows these different series.

I shall now make a few remarks about the birds from Charles, Hood, Barrington, and South Albemarle, which were contained in a box which disappeared in Guayaquil. The loss is not quite so unfortunate as stated by Mr. Ridgway. He remarks that it contained more than forty land birds from the southern part of Albemarle Island, but this statement, as will be seen from the list which I now give, is not correct. The only two species of birds which are lost are two specimens of Camarhynchus, and the new species of Nesomimus from Barrington Island, of which accidentally no alcoholic specimens were preserved. All the other species contained in the box are represented by alcoholic material.

List of lost specimens from Charles, Hood, Barrington and South Albemarle, and the number of alcoholic specimens preserved:

CHARLES ISLAND.

2 *Dendroica aureola* (Gould), 5 in alcohol.
6 *Geospiza fortis* and *fuliginosa* Gould, 33 in alcohol.
26 *Cactornis intermedia* Ridgw., 8 in alcohol.
11 *Camarhynchus.*
2 *Myiarchus magnirostris* (Gould), 3 in alcohol.

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[5] Baur, G. Ein Besuch der Galápagos Inseln. Biolog. Centralbl. Bd. XI, 1892, p. 248–249.

3 *Pyrocephalus carolensis* Ridgway, 3 in alcohol.

6 *Coccyzus melanocoryphus* Viell.

2 *Nesopelia galapagoensis* (Gould).

HOOD AND GARDNER ISLANDS.

10 *Nesomimus macdonaldi* Ridgw., 1 skin, 9 in alcohol.

1 *Dendroica aureola* (Gould), 2 in alcohol.

6 *Certhidea cinerascens* Ridgw., 5 in alcohol.

7 *Geospiza* sp.; 10 *Geosp. conirostris* Ridgw., in alcohol.

13 *Geospiza fuliginosa* Gould, *in alcohol.*

1 *Myiarchus magnirostris* (Gould), 7 *in alcohol.*

BARRINGTON ISLAND.

11 *Nesomimus* n. sp.

3 *Dendroica aureola* (Gould), 2 in alcohol.

1 *Certhidia bifasciata* Ridgw., 3 skins from alcoholic specimens.

4 *Geospica*, 11 in alcohol.

7 *Cactornis barringtonensis* Ridgw., 3 skins from alcohol, 1 alcoholic.

2 *Camarhynchus* spec.

2 *Myiarchus magnirostris* (Gould), 4 in alcohol.

SOUTH ALBEMARLE ISLAND.

3 *Nesomimus parvulus* (Gould), 6 skins and 2 in alcohol.

6 *Dendroica aureola* (Gould), 6 in alcohol.

3 *Certhidea albemarlei* Ridgw., 2 skins, 2 in alcohol.

15 *Geospiza* (No. 316, large black; No. 336 large black, fine; No. 358,366, large black); (3 medium size, 8 small).

6 *Geospiza strenua* Gould, in alcohol.

10 *G. fortis* Gould in alcohol.

44 *G. fuliginosa* Gould in alcohol.

8 *Camarhynchus* (3 large, 5 small), 11 in alcohol.

6 *Cactornis fatigata* Ridgw., 6 in alcohol.

2 *Cactornis productus* Ridgw., 2 skins are preserved.

4 *Myiarchus magnirostris* (Gould), 2 in alcohol.

3 *Pyrocephalus intercedens* Ridgw., 1 skin preserved, 8 in alcohol.

2 *Himantopus mexicanus* (Müller), 2 skins are preserved.
1 *Coccyzus melanocoryphus* Vieill.
1 *Nesopelia galapagoensis* (Gould).

ADDITIONS TO THE LIST OF BIRDS GIVEN BY RIDGWAY FOR THE DIFFERENT ISLANDS.

ALBEMARLE ISLAND.

Ridgway enumerates 35 species from Albemarle, and remarks: "As Dr. Baur and his associate, Mr. Adams, collected more than forty species in South Albemarle, there are, at least, twenty-five species found there which are, as yet undetermined. I cannot support this statement. Ridgway himself names 33 species collected by us. The following have to be added: *Progne modesta* Néboux, *Coccyzus melanocoryphus* Veillot, *Fregata aquila* (Linn.), *Ardea herodias* Linn., *Phoenicopterus ruber* Linn., *Nesopelia galapagoensis* (Gould), *Larus fuliginosus* Gould, *Aestrelata phaeopygia* Salvin., *Procellaria tethys* Bonaparte.

The large white heron, of which I saw four specimens in South Albemarle and one in East Albemarle opposite Cowley Island, is certainly not a white phase of the large gray heron, but *Herodias egretta* (Gmelin). I have observed different specimens of *Ardea herodias* (Linn.) on South Albemarle. We have therefore, in all, 42 specimens of birds on Albemarle, and I do not believe that this number will be much increased, at least in the land birds, by further examination.

BRATTLE ISLAND.

This very small island is very close to South Albemarle. Besides *Sula nebouxii* Milne-Edwards and *Creagrus furcatus* (Néboux), *Fregata aquila* (Linn.) breeds there. There are also a few small land birds (Geospiza).

DUNCAN ISLAND.

To the 9 species mentioned by Ridgway the following have to be added. *Cactornis pallida* Scl. and Salv. (?) besides the black *Cactornis* sp.; *Progne modesta* (Néboux), *Asio galapagoensis* (Gould), *Fregata aquila* (Linn.), *Pelecanus californicus* Ridgway, *Sula nebouxii* Milne-Edwards; *Anous galapagoensis* Sharpe, *Aestrelata phaeopygia* Salvin, *Procellaria tethys* Bonaparte.

CHARLES ISLAND.

Arenaria interpres (Linn.); *Haematopus galapagoensis* Ridgw., *Oceanites gracilis* Elliot).

HOOD ISLAND.

Fregata aquila (Linn.) and *Phaëthon aethereus* Linn.

GARDNER ISLAND,[6] NEAR HOOD.

Nesomimus macdonaldi Ridgw., *Certhidia cinerascens* Ridgw., *Geospiza conirostris* Ridgw., *Geospiza fuliginosa* Gould, *Haematopus galapagoensis* Ridgw., *Nyctanassa violacea* (Linn.), *Anous galapagoensis* Sharpe.

STEEP ROCKS BETWEEN GARDNER AND HOOD.

Creagrus furcatus (Néboux), breeding.

CHATHAM ISLAND.

Cactornis pallida Scl. and Salv., possibly a new species; *Phaëthon aethereus* Linn., *Aestrelata phaeopygia* Salvin, *Procellaria tethys* Bonaparte.

BARRINGTON ISLAND.

Progne modesta (Néboux), and between Barrington and Indefatigable, *Creagrus furcatus* (Néboux), *Phaëthon aethereus* Linn. and *Diomedea* spec.

INDEFATIGABLE ISLAND.

Ardea herodias Linn., *Pelecanus californicus* Ridgw., *Oceanites gracilis* (Elliot).

NEAR SEYMOUR ISLANDS,

Forming the most northerly point of Indefatigable: *Creagrus furcatus* (Néboux), *Phaëthon aethereus* Linn. and *Diomedea* spec.

JERVIS ISLAND.

Geospiza strenua-magnirostris Gould; *G. fuliginosa* Gould, *Cactornis pallida* Scl. & Salvin, *Buteo galapagoensis* Gould, *Pele-*

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[6] This is not Gardner Island, which is a small rock east of Charles Island. This fact shows at once that the *Nesomimus* found here is not *N. trifaciatus* (Gould) as supposed by Ridgway, p. 478, p. 481, but *N. macdonaldi* Ridgw. The specimens are not lost.

canus californicus Ridgw., *Sula nebouxii* Milne-Edw., *Larus fuliginosus* Gould, *Anous galapagoensis* Sharpe, *Nesopelia galapagoensis* (Gould).

JAMES ISLAND.

Pelecanus californicus Ridgw., *Creagrus furcatus* (Néboux), (Sullivan Bay, N.-E. end), *Spheniscus mendiculus* Sundevall.

TOWER ISLAND.

Haematopus galapagoensis Ridgw., *Butorides plumbeus* (Sundev.), *Phaëthon aethereus* Linn. Mr. Ridgway states p. (600) that there were no specimens in the Baur-Adams collection; this is not correct; six fine skins were secured.

BINDLOE ISLAND.

Camarhynchus bindloei Ridgw., which was based on our specimens, is placed in Habel's column. My list is: *Nesomimus bindloei* Ridgw., *Dendroica aureola* (Gould), *Certhidia* spec., *Geospiza strenna* Gould, *Geospiza fortis* Gould, *Geospiza parvula* Gould, *Cactornis assimilis* Gould, *Camarhynchus bindloei* Ridgw., *Myiarchus magnirostris* (Gray), *Pyrocephalus* spec., *Asio galapagoensis* (Gould), *Buteo galapagoensis* (Gould), *Fregata aquila* (Linn.), *Pelecanus californicus* Ridgw., *Sula nebouxii* Milne-Edw., *Sula brewsteri* Goss, *Nesopelia galapagoensis* (Gould), *Haematopus galapagoensis* Ridgw., *Nyctanassa violacea* (Linn.), *Arenaria interpres* (Linn.), *Larus fuliginosus* Gould.

ABINGDON ISLAND.

Besides *Nesomimus personatus* Ridgway, the only bird mentioned as ascertained by us, the following species were collected: *Certhidia fusca* Scl. and Salv., *Geospiza fratercula* Ridgw., *G. parvula* Gould, *Cactornis abingdoni* Scl. and Salv.; and the following birds were observed: *Buteo galapagoensis* (Gould), *Fregata aquila* (Linn.), *Pelecanus californicus* Ridgw., *Butorides plumbeus* (Sundevall), *Creagrus furcatus* (Néboux).

One set of the Baur-Adams Collection is at Clark University, Worcester, Mass., but the bulk of the collection has gone to the Zoological Museum at Tring.